

REMARKS

Claims 1, 2, 5, 6, 9, 10, 20, 21, 24, 25, 28, 29, 32, and 33 are pending, with claims 1 and 2 being independent. Claims 2, 9, and 10 have been amended and claims 3, 4, 7, 8, 11, 17, 18, 22, 23, 26, 27, 30, 31, 34, and 35 have been canceled. Support for the amendments can be found in the originally-filed specification, at least at page 8, line 10 through page 10, line 17; page 12, lines 1-17; and Figs. 1A-1D and 3A-3E. No new matter has been introduced.

Claims 1, 2, 9, 10, 20, 21, 24, 25, 32, and 33 have been rejected as being unpatentable over U.S. Patent No. 4,646,424 (Parks) in view of U.S. Patent No. 6,009,888 (Ye) and U.S. Patent No. 5,252,427 (Bauer).

Applicant requests withdrawal of the rejection of claims 1, 9, 20, 24, and 32 because neither Parks, Ye, Bauer, nor any proper combination of the three describes or suggests removing a resist pattern by using a resist stripper which dissolves and removes the resist pattern after irradiating the resist pattern, as recited in independent claim 1.

The Office argues that Parks shows at col. 2, lines 59-68; col. 3, lines 1-10; and col. 6, lines 3-59 "removing the remaining resist material (after etching the metal i.e., titanium) by using a stripper (stripping the remaining resist, resist removing process, a resist stripper dissolves and removes the remaining resist)." These passages explain that a layer of titanium is disposed over a silicon dioxide layer 12, the titanium layer is then coated with a photoresist, which is exposed through a pattern mask to create a pattern of exposed resist material that is used to etch the titanium to produce the gate electrode 14. Therefore, the pattern mask is first placed over the photoresist layer, and then the photoresist layer and the pattern mask are exposed in order to create a resist pattern that is then used to etch the titanium. Thus, the resist pattern is created after the exposure and before the titanium is etched. Therefore, in Parks, the resist pattern cannot be said to be irradiated after the resist pattern is used in etching the titanium. Indeed, since the exposure step is used in forming the resist pattern, the resist pattern doesn't exist yet during the exposure step and the exposure step cannot be said to be irradiating a residue of the resist pattern.

Additionally, Parks next explains that the wafer is plasma ashed to remove the resist (which is at that stage in the form of a resist pattern). See Parks at col. 3, lines 4-8 and col. 6,

lines 44-51. Thus, in Parks, the resist pattern is removed by an ashing method, and not by using a resist stripper. The Office points to col. 6, lines 58-60 of Parks to somehow suggest that the resist pattern is removed using a resist stripper that dissolves and removes the resist pattern. This passage of Parks merely explains "a remaining resist material is stripped from the substrate." There is nothing in this passage that suggests that a resist stripper is used to dissolve and remove the resist pattern. Moreover, Parks explains in greater detail at col. 3, lines 4-8 and col. 6, lines 44-51 that the resist pattern is stripped by using a plasma ashing method, which is very different from removal using a resist stripper that dissolves and removes the resist pattern. As previously explained, plasma ashing does not dissolve the resist pattern.

Ye and Bauer, which were not relied upon to show these features, do not remedy the failure of Parks to describe or suggest this subject matter.

In Ye, the photoresist pattern 28 is not removed using a resist stripper. Rather, in Ye, the photoresist pattern 28 is removed with a combination of a UV laser 111 and an acid bath. See Ye at col. 6, lines 32-34 and col. 6, line 62 to col. 7, line 3.

Additionally, Ye's removal of the photoresist pattern 28 is not performed after irradiation of Ye's photoresist pattern 28. Rather, the removal of Ye's photoresist pattern 28 is performed concurrently with or prior to irradiation of Ye's photoresist pattern 28. As Ye explains, "the photoresist pattern 28 and polymer layer 30 are immersed in a wet bath 34 ... and then the wafer, polymer and photoresist are irradiated 36 with UV light, preferably from a UV laser." See Ye at col. 5, lines 43-49 and Fig. 3.

Bauer relates to a photoresist composition containing a polymeric material and a substance that forms an acid upon exposure to actinic radiation. See Bauer at Abstract and col. 2, line 58 to col. 3, line 4. The photoresist can be used to prepare printed circuits by applying a layer of the photoresist to a surface of the substrate. See Bauer at Abstract and col. 3, lines 5-10. The photoresist layer is exposed to actinic radiation to form exposed image areas in the photoresist layer. See Bauer at col. 3, lines 21-23. Then, the exposed areas of the photoresist layer are removed with a developer solution to uncover substrate surface areas, and the uncovered substrate surface areas are either etched or plated with another metal. See Bauer at col. 3, lines 23-29. The unexposed resist is removed by "a stripping process involving re-exposure to actinic radiation followed by a second development operation to form the circuit

board directly." See Bauer at col. 6, lines 54-63. Alternatively, the unexposed resist is removed from the unplated copper surface, "which is then etched or removed from the substrate to form a plated printed circuit board." See Bauer at col. 6, lines 63-66.

Thus, the first irradiation of Bauer's photoresist layer occurs prior to etching. And, while the second irradiation of Bauer's photoresist layer occurs after the etching of the uncovered substrate surface areas, the photoresist layer is not then removed after irradiation using a resist stripper that dissolves and removes the photoresist. Rather, the photoresist layer is removed due to the re-exposure to the radiation. See Bauer at col. 6, lines 60-62.

Additionally, there is nothing in the cited art that would have motivated one of skill in the art to modify Parks to provide for such irradiation or to provide for removal of a resist pattern using a resist stripper after irradiating the resist pattern. Any such modification of Parks would change the principle of operation of Parks, which merely uses plasma ashing to remove a resist and never suggests irradiating the resist prior to removal of the resist. See Parks at col. 2, line 58 to col. 3, line 8.

Accordingly, claim 1 is allowable over any proper combination of Parks, Ye, and Bauer, as are dependent claims 9, 20, 24, and 32.

Applicant requests withdrawal of the rejection of claims 2, 10, 21, 25, and 33 because neither Parks, Ye, Bauer, nor any proper combination of the three describes or suggests removing a residue of a resist pattern by using a developer that is used in developing a resist film to form the resist pattern after etching, as recited in independent claim 2.

There is nothing in Parks that suggests that the resist pattern is removed using a "developer" that is used in developing to form the resist pattern. Rather, as discussed above, Parks explains that the photoresist material is removed using a plasma ashing method in an oxygen atmosphere. See Parks at col. 6, lines 44-47. Additionally, Parks never describes or suggests that the photoresist material is removed after a resist pattern is irradiated, since Parks does not describe irradiation of a residue of a resist pattern with a light.

Moreover, while Ye mentions that a UV laser in combination with an acid bath is used to remove the photoresist pattern 28, Ye fails to describe or suggest that the photoresist pattern and the residue of the resist pattern are removed using a developer after the UV laser irradiates a residue of the photoresist pattern 28.

Realizing these deficiencies in Parks and Ye, the Office cites Bauer, and argues that Bauer discloses at col. 6, lines 54-68 that the remains of a resist pattern are "further irradiated and removed using a developer." This passage of Bauer explains that an unexposed resist is removed by a stripping process involving re-exposure to actinic radiation followed by a second development operation to form the circuit board directly. The first development involves a developer solution that selectively dissolves exposed areas. See Bauer at col. 6, lines 39-53. However, Bauer never describes or suggests that the developer used to remove the resist pattern is the same developer that is used to form a resist pattern.

Additionally, it would not have been obvious to modify Parks to provide for removal of a residue of a resist pattern using a developer that is also used to form a resist pattern because any such modification of Parks would change the principle of operation of Parks, which merely uses plasma ashing to remove a resist and never suggests irradiating the resist prior to removal of the resist. See Parks at col. 2, line 58 to col. 3, line 8. Moreover, Bauer's use of the developer occurs during a step that precedes an etching, while Parks removal of the residue of the resist pattern occurs after an etching. Thus, one of skill in the art would not be directed to use a developer, as merely mentioned by Bauer in another step in a different process, to remove the residue of a resist pattern in Parks.

Accordingly, claim 2 is allowable over any proper combination of Parks, Ye, and Bauer, as are dependent claims 10, 21, 25, and 33.

Applicant : Masaharu Nagai et al.
Serial No. : 10/694,986
Filed : October 29, 2003
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Attorney's Docket No.: 12732-0171001 / US6695

In conclusion, applicant submits that all claims are in condition for allowance. No fee is believed due. Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: August 28, 2008

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